

CLAIMS

What is claimed is:

1. An adhesion promoter comprising:
a polymeric strand with an epoxy-reactive group other than a phenolic hydroxyl group and
further comprising a crosslinking group;
wherein the crosslinking group is capable of crosslinking the polymeric strand with a rubber
in a crosslinking reaction; and
wherein the polymeric strand is water soluble in an amount of no less than 10g/l.
2. The adhesion promoter of claim 1 wherein the polymeric strand comprises an organic polymer.
3. The adhesion promoter of claim 2 wherein the organic polymer comprises polybutadiene.
4. The adhesion promoter of claim 3 wherein the polybutadiene is grafted with a maleic anhydride, and wherein the maleic anhydride is reacted with a compound selected from the group consisting of a methoxy polyethylene glycol, a monoamine terminated polyoxyalkylene, and a monoalcohol terminated polyoxyalkylene.
5. The adhesion promoter of claim 1 further comprising a second polymer.
6. The adhesion promoter of claim 5 wherein the second polymer comprises a styrene-butadiene-vinylpyridine terpolymer.
7. The adhesion promoter of claim 1 wherein the epoxy-reactive group is a carboxylic acid group.
8. The adhesion promoter of claim 1 wherein the crosslinking group is in the backbone of the polymeric strand.
9. The adhesion promoter of claim 8 wherein the crosslinking group comprises a double bond.
10. The adhesion promoter of claim 1 wherein the crosslinking reaction comprises formation of a covalent bond with a sulfur atom.

11. The adhesion promoter of claim 1 wherein the crosslinking reaction comprises a reaction selected from the group consisting of a nucleophilic addition, an electrophilic addition, and a cyclo addition.
12. The adhesion promoter of claim 1 wherein the rubber is at least one of a synthetic rubber and a natural rubber.
13. The adhesion promoter of claim 6 wherein the rubber further comprises polybutadiene grafted with maleic anhydride.
14. A rubber containing product comprising:
a polymeric fiber coated with a compound having a plurality of epoxy groups, wherein the polymeric fiber is coupled to a rubber via an adhesion promoter;
wherein the adhesion promoter comprises a polymeric strand with an epoxy-reactive group other than a phenolic hydroxyl group, and further comprises a crosslinking group that has crosslinked the polymeric strand with the rubber; and
wherein the adhesion promoter is water soluble in an amount of at least 10g/l.
15. The rubber containing product of claim 14 wherein the polymeric fiber comprises a polyester fiber, the polymeric strand comprises maleinized polybutadiene derivatized with methoxy polyethylene glycol, the epoxy-reactive group comprises a carboxylic acid group, and wherein the crosslinking group comprises a double bond.
16. The rubber containing product of claim 14 wherein the polymeric fiber comprises a polyester fiber, the polymeric strand comprises maleinized polybutadiene derivatized with a mono-amine terminated poly(ethylene oxide-propylene oxide) copolymer, the epoxy-reactive group comprises a carboxylic acid group, and wherein the crosslinking group comprises a double bond.

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17. The rubber containing product of claim 14 further comprising a styrene-butadiene-vinylpyridine terpolymer, wherein at least a portion of the styrene-butadiene-vinylpyridine terpolymer is coupled to the rubber.
18. A method of fabricating a rubber containing product, comprising:
providing a rubber, and a polymeric fiber comprising a plurality of epoxy groups;
providing an adhesion promoter having a polymeric strand with an epoxy-reactive group
other than a phenolic hydroxyl group, and further having a crosslinking group, and
wherein the adhesion promoter is water soluble in an amount of at least 10g/l;
covalently coupling the rubber with the polymeric fiber via the adhesion promoter, wherein
the epoxy-reactive group forms a covalent bond with the epoxy group, and wherein
the crosslinking group forms another covalent bond with the rubber.
19. The method of claim 18 wherein the adhesion promoter comprises a maleinized polybutadiene derivatized with methoxy polyethylene glycol.
20. The method of claim 18 wherein the adhesion promoter comprises a maleinized polybutadiene derivatized with monoamine terminated poly(ethylene oxide-propylene oxide) copolymer.
21. The method of claim 18 further comprising providing a styrene-butadiene-vinylpyridine terpolymer and coupling at least a portion of the styrene-butadiene-vinylpyridine latex to the adhesion promoter.
22. The method of claim 21 further comprising admixing a maleinized polybutadiene with the rubber.